International Journal of Psychology and Behavioral Sciences 2020, 10(4): 93-99
DOI: 10.5923/j.ijpbs.20201004.02

Fluid Thinking for Ageing Parents – Compensating the Psychological Risks of COVID-19 Pandemic Using Gamification

Mohamed Buheji

International Inspiration Economy Project, Bahrain

Abstract Ageing is a complicated process that every one of us most probably would go through as part of their life journey. Therefore, many family members are trying to find more innovative ways to manage their ageing parents and provide them with the best quality of life. Many of these ageing parents might have reversible dementia which can be restored, or maintained through cognitive activities. Based on the synthesis of the literature review, the types of fluid thinking driven gamification suitable for an ageing parent are defined. These types are set in one framework to help the family members, and the designers of the game to ensure all the assessment inputs, the activities of game deployment and the outcome are precise. Despite the limitation of the none-tested framework, this paper carries significant implications for ageing parents caregivers and family members who are keen to mitigate their loved ones challenge of memory loss. The paper opens a variety of opportunities for future research in areas of geriatric care, neuroscience, intergeneration, and gamification.

Keywords Fluid Thinking, Crystallised Thinking, Ageing Parents, Gamification, COVID-19, Working Memory, Dementia

1. Introduction

Lifestyle and isolation, especially in the time of the COVID-19 are speeding up the deterioration of older adults and the ageing parents' capacity to integrate or communicate with their surroundings. Due to fast changes in a social lifestyle, and changes in age, most people have to accept the deterioration of cognitive performance. Buheji et al. (2020); Horn and Cattell (1967).

Samuel (2017) called for reviving the practice of engaging older adults in participatory, professionally run arts programs with a focus on social engagement that helps to bring opportunities for meaningful creative life journey. One of the targets of engaging older people is helping them feel confident with their capacity to organise and store information, and sustain this capacity.

One of the major complicating factors of ageing parents is understanding how to stop or eliminate the effects of their deteriorating memory, or redevelop their capacity to interact with their surroundings. This issue even gets more complicated if the ageing parent is having symptoms of a type of dementia.

* Corresponding author:
buhejim@gmail.com (Mohamed Buheji)
Received: Sep. 10, 2020; Accepted: Oct. 12, 2020; Published: Oct. 17, 2020
Published online at http://journal.sapub.org/ijpbs

Many ageing parents might have a reversible dementia which can be restored or maintained through cognitive activities. This might help to eliminate dementia-like symptoms like forgetfulness, disorientation, inattentiveness, and slowed responses that lead to depression.

When the older adult shows signs of depression mood, which is most probably a type of pseudodementia, this means they are on the verge of mental decline. Memory loss, lack of concentration, wariness, and lack of expression or engagement would be other signs of dementia. These signs might be observed by the siblings of ageing parents, but not properly analysed or interpreted.

Memory loss is one of the main causes for further types of depression and disruption of life. One of the ways to conceal the dementia memory problems in the ageing parents, is to help them to revive some of their capacity to organise and recall new information.

In this review, the importance of fluid and crystallised thinking is exploited on the quality of life and the functionality and the working memory of the ageing parents. The author explores how this is linked to the old adults lifelong learning that leads enhance their renewing capacity. The review shows that utilisation of fluid thinking triggering techniques, like gamification, which helps to enhance the ageing parents' functionality and engagement. Buheji (2019b); Brown (2016).

2. Literature Review

2.1. Realising What Constrains Ageing Parents Autonomy

In recent years many attempts have been taken to manage the ageing parents' quality of life and understand more the motivations that would keep them with active and curious behaviours, Buheji (2019a). Since many older adults are living today with dementia or mental health issues, or causes related to anxiety and depression, taking time to understand their behaviour is very important in order to ensure effective communication channels stay vibrant and be a source for excitement.

Realizing what keeps ageing parents' autonomy requires exploring their previous habits and whether this action comes from an accumulated mindset or due to recent disease. i.e. is it due to depression, or it is a symptom of dementia. Once the causes of parents' behaviour are identified, we can figure out the alternative ways to rectify towards positive changes.

2.2. Optimising Ageing Parent Rights

We have to live with a main reality, that is we cannot force our ageing parents to do anything they do not like to do unless we become creative in convincing them. Personally, the author tried more than ten ways to persuade his ageing parents for their own good, but failed. Taking into consideration that when we grow older as their age, we want to have the right to make our own decisions, as much as possible, made the author stop trying more ways.

Hence, going back to accepting the fact as hard as it is, we need to bring up ways for solving the source of the problem, i.e. the intelligence capacity, rather than trying to deal with the symptoms, i.e. the resistance to cooperate to go out, take a bath, communicate, etc. If we manage to do this only, we can help lower our stress and even improve the goal of delivering to them the best 'quality of life' possible.

2.3. Focusing on the Causalities not on the Symptoms

Many of us keep pressuring our parents to do this and that to keep them functional, but in reality, we are trying to treat the symptoms, not the causes. When we get old, we tend to lose the capacity to store and organise memory unless we keep it active. To keep the memory active, which is the source of most of the dementia like diseases, we need first to get our elderly or the ageing parent out of the routine setting, by focusing on the essentials that keep them challenged with certain problems to solve. Having a drive for a new problem to solve every day gives meaning to the essence of existence.

Focusing on the causalities should start before the older adult, or the ageing parent starts to experience a decline in their cognitive ability, i.e. before they reach a low capacity in making hard decisions, solving problems, or making accurate judgments. This is highly essential since the more the ageing parent experience a decline in the cognitive capacity; this would lead to potential changes in the mood and even personality. Changes in the mood would create a new gained habit that might be very difficult to overcome with medical intervention. Due to this, we need to observe and manage the cognitive challenge in the ageing parent before they become more apathetic.

Being challenged with problems would make the ageing parent feel their importance for being alive and would trigger more their expertise or make them more interact active with the family members. In short, they need techniques that can bring their attention and focus.

2.4. Ageing Parents and Fluid Thinking

Fluid thinking or intelligence refers to the ability to reason and think flexibly. Crystallised thinking, refers to the accumulation of lifelong learning, knowledge, and competencies that need to be disseminated by a certain means. As you might expect, this type of intelligence tends to increase with age. The more learning and experience you have, the more you can build up your crystallised intelligence. Au et al. (2015); Horn and Cattell (1967).

Fluid thinking can be applied to any novel situation where the older adult needs to abstract the facts of the situation that requires solving. The more the fluid thinking could be sharpened, and the ageing parent stays familiar or attempts problem-solving, the more they could have the functionality of their long-term memory. Huepe et al. (2020). Both fluid and crystallised thinking help the individuals to exploit their composed capacities when they interact with the community, or when being challenged. They produce together what constitutes the overall individual intelligence. Barbey (2018).

Fluid thinking tends to increase throughout childhood and adolescence, but decline during late adulthood. The progressive decline of fluid thinking capacity depends on the personal history of utilisation of this type of thinking during adolescence specifically. i.e. If the person utilises fluid thinking more during youth, his/her decline would be late by 10 to 30 years, or more. Brown (2016); Manard et al. (2014).

Fluid thinking helps us to see and perceive the new relationships independent of any previous practices. This raises the ability to solve problems, especially if we can utilise the existing knowledge, or retrieve the existing knowledge. Brown (2016). Huepe et al. (2011).

Fluid thinking helps in older adults functioning and the exploitation of logical reasoning that demands frontal lobe functions. This might help in psychosocial development. With fluid thinking, we can improve the elders counterfactual thinking which help them to see what else they could or should or should not do. i.e. It is a type of thinking that is either additive or subtractive, or upward thinking which is highly essential for encouraging the elders to engage with their surroundings. Barbey (2018).

Mitigating age-related decline in proactive cognitive control abilities in an ageing parent can help to maintain their reactive control. To sustain this reactive control, cognitive resources can be exploited by fluid thinking to enhance

working memory. If older adults managed to use fluid thinking, their attention would increase. i.e. they would be less distractible, more impulsive, and more curios. Buheji (2019a); Manard et al. (2014).

2.5. Understanding Ageing Parents Working Memory

2.5.1. Understanding Cognitive Thinking

In order to maintain the cognitive thinking of the ageing parent, we need to maintain fluid thinking as high as possible, so that their crystallised thinking which includes reading and comprehension, would also maintain their capacity. Hartshorne and Germine (2015). This would help to have ageing parent people who are beyond 65 years who can both retrieve and share profound knowledge and wisdom. Buheji and Buheji (2020).

We need to emphasis the healthiness of the working memory since it involves their capacity to store information for a brief period of time and then their ability to mentally manipulate it and retrieve it.

In order to have effective memory training, we need to have specified the type of working memory task that we need to improve. For example, seeing what type of specific task performance, Jaeggi, et al. (2008). The training would build links between unrelated cognitive skills, including the ability for reasoning, which is the key to solving new problems. This is very important especially if the capacity to solve problems does not depend on previously acquired knowledge. Au et al. (2015); Hartshorne and Germine (2015).

2.5.2. Role of Areas of Explicit Memory in the Brain

The brain of a human has three areas that control or manage memory: the hippocampus, the neocortex and the amygdala. As shown in Figure (1), the hippocampus, is located in the brain's temporal lobe. This lobe is where the episodic autobiographical memories are formed, and indexed for ease of access. It is the area where memories like the excitements of games experienced with the family, or friends could be retrieved.

The neocortex is part of the cerebral cortex which forms the outside neural surface of the brain which is involved with sensory perception, and spatial reasoning; besides generation of motor commands. Figure (1) shows the pre-frontal lobe where memories of excitements and challenges are associated before temporarily stored in the hippocampus. These memories are then transferred to the neocortex. Then the amygdala, also plays a role in attaching emotional significance to memories. These types of emotional memories are important for ageing parents who would be particularly reactive to strong emotional memories.

The areas of memory of the brain can be excited through effective and simple fluid thinking exercises which are in this paper proposed to be more through games and/or gamification techniques. The exercises help to raise the ability to understand relationships among the components of problem-solving, which help to build new knowledge and experiences. Huepe et al. (2020); Buheji (2019b).

During the exercise of gaming or gamification, we need to assess our ageing parent if they are able to engage in the abstraction of thoughts and ideas, besides reasoning. This abstraction of ideas would help them to crystallise their thoughts and gain new experiences. Buheji and Buheji (2020).

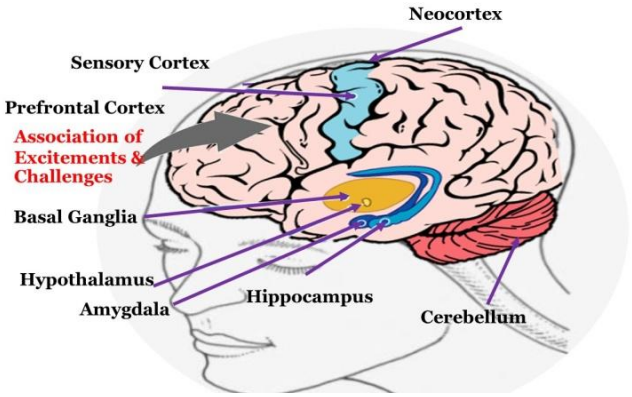

Figure (1). Areas of Memory in the Brain

2.6. Renewing Capacity of Thinking in Ageing Parents

If fluid thinking is lost quite early in life, i.e. below age 40, crystallised thinking would reach its peak capacity at the stage of 60 years old or later by a few years. Crystallised thinking could be improved through learning and optimised accumulated knowledge. Formal and informal learning can be very beneficial for crystalised thinking. Lifelong learning (LLL) enhance our methodical thinking which makes us act in a systematic or sequential way, thus avoiding the need for reasoning or exploring different relationships. Buheji (2018).

To optimise the capacity of the older adults for maintaining their crystalised thinking which includes knowledge, we need to encourage them to pay attention or what could be a source of passion. The more we manage to drag their attention and passion, the more we enhance their capacity to associate and thus come with none obvious solution.

Fluid thinking can be improved by brain training in older adults. If fluid thinking stays longer with us as we age, we could still use more the accumulated knowledge and crystallise understanding as part of renewable intelligence. With fluid intelligence, we improve our ageing parent problem-solving capacity to recall the exact knowledge that could be retrieved or deployed. Au et al. (2015).

Our ageing parent could be involved more with their family, or their community due to continuous ability to reason and deal with complex information around them. When our elders get engaged with the specific discussion and use reasoning, they revive their long-term memory. Buheji and Buheji (2020). To improve fluid thinking, we need to understand how long-term and short-term memory works. Long-term is focused on storing facts and information over long periods of time. While working

memory is a form of short-term memory centred on what you are currently thinking about. Jaeggi et al. (2008).

2.7. Maintaining Ageing Parents Functionality and Engagement

Living and observing elders deteriorate with the functionality, and getting engaged does not happen at a sudden. Like any biological system, there are alarms and signs that show that they are losing it, Manard et al. (2014). For example, you would notice that the elder would like to avoid situations that may be unpleasant to them, since they lost touch with people, or external environment, or due to their loss of smell or taste. The act of not engaged would lead to more avoidance behaviour and resistance to essential life activities.

The more we manage to sustain to make the ageing parent to consider another outcome in many actions they based on a different path of activity, the more they may see, or feel confident, that they are still functional and would want still to take certain decisions to create, or control specific outcome. Failing to trigger the quality thinking of the ageing parent tends to make them feel negative about the outcome and the sense of not worth living. This makes them less engaged and with time even less functional and less capable of dealing with life issues or seeing the benefits of future planning.

When the older adult could practice reasoning, they would be more resilient and would accept to cooperate to compensate for their deterioration of functionality. This reasoning capacity would give them more reason to live, or function, or engage. Manard et al. (2014). Figure (2) shows areas for assessment for the sources of ageing parents memory Loss which could be reversed if integrated within the right time, with fluid thinking techniques as games or gamification. Once any symptoms of depression mood, cognitive memory performance deterioration, forgetfulness, increase for isolation, more apathy, slowness in responding or in participation, inattentiveness, or continuous disorientation; are discovered then more fluid thinking exercises need to be deployed. Buheji (2019b).

2.8. Gamification as a way to Revive Ageing Parents Fluid Thinking

To have a better fluid and crystallised thinking, we need to bring all the methods that can enhance the ageing parents' capacity to stay functional and active. Gamification can be one of the dynamic sources that can help to bring natural thinking to the life of the ageing parent. With gamification, we could influence interest, motivation, which might bring experience, and years of schooling. Buheji (2019b); Kievit et al. (2016).

Koivisto and Malik (2020) reported that older adults developed better visual attention rehabilitation, diabetes control, increasing positive emotions, mitigation of depression through gamification. Perceptions of self-efficacy, motivation and positive emotions found to increase engagement, physical activities and lead to better learning and autonomy capacity.

Zelinski and Reyes (2009) shown that some games, like action games, can produce cognitive benefits in the older adult population, and enhanced their brain plasticity effects positively. Gamification has been successfully used to motivate people to reach their goals more efficiently or turn unpleasant tasks into fun ones. The literature shows there is a huge gap of gamification designs or applications targeting elderly people, or ageing parent (ages from 70+). The work of Altmeyer et al. (2018) shown that gamification affects the older adults' attitudes positively while playing, and found to motivate them to socialise more. The Altmeyer team recommended that special older adults games focus on designs with badges and points; this achievement sense should encourage the ageing parent to collaborate and care-taking, instead of competitions.

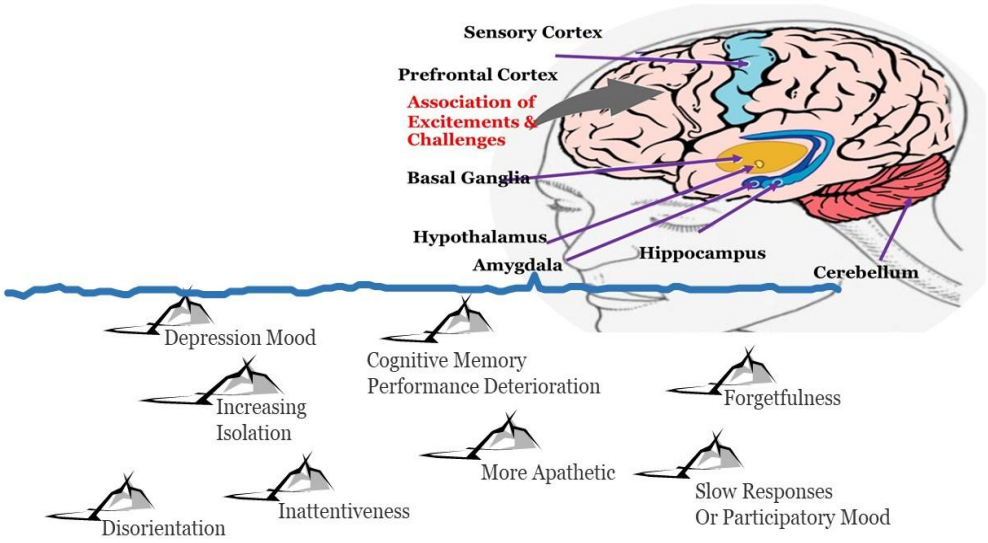

Figure (2). Illustrates the Sources of Memory Deterioration in the Brain of the Ageing Parent

3. Methodology

Based on the synthesis of the literature review, the types of fluid thinking driven gamification suitable for an ageing parent are defined. These types are set in one framework to help the family members and the designers of the game to ensure all that is needed are available within the constructs of the game.

The physiological integration of how the brain manages the memory, besides the sources of the memory loss due to ageing or other natural enforced conditions, as COVID-19 pandemic spillovers; are analysed and synthesised to ensure the reliability of the proposed framework.

4. Framework Proposed

Based on the reviewed literature, a clear gap in the body of the knowledge on how to mitigate the deterioration of the memory of the older adults, or the ageing parents, through enhancing their fluid thinking. Therefore, a framework is proposed for maintaining the ageing parents' functionality and engagement through game and gamification that enhance their fluid thinking capacity. The framework tries to overcome the constraints of ageing parents' autonomy, through a clear process that consists of input, assessment activity and clear output which really represents the outcome of exploring the potential sources that would re-invent the fluid thinking in the ageing parent, through specifically games approaches or gamification techniques.

As shown in Figure (3) the inputs (the condition assessment points) are in red colour, focusing on the lifestyle and the increase of the ageing parent isolation; specifically, during COVID-19 pandemic. The other input comes from the facts or the observations of the family members or from the professional assessment on: memory loss, lack of concentration, wariness, and lack of expression or engagement. The other sign for the input of this framework is once we start to see the parent become more apathetic. The details of the assessment can be seen in Figure (2) discussed earlier.

The activity explored, i.e. the actions during the deployment of the games, or the gamification exercises are shown in Figure (3) in black. The framework focus on the tools or the approaches that would help the ageing parent redevelop their capacity to interact with their surroundings, or would raise their capacity to organise and recall new information. During the gamification, we need to ensure effective communication channels so that they stay vibrant and be a source of excitement.

The output in the framework proposed hypothesis that the ageing parents' capacity to integrate or communicate would increase, since game or gamification would develop their participatory mood. The output is seen in purple in Figure (3). The other outcome that could be noticed after repeated exercises of games is the redevelopment of the ageing parent capacity to interact with their surroundings. At this stage, the ageing parent is expected to feel confident with their capacity to organise and store information. In the same time, the caring family members should realise more the motivation that could trigger the ageing parent best behaviour and discover the most effective communication channels that make them stay vibrant and excited.

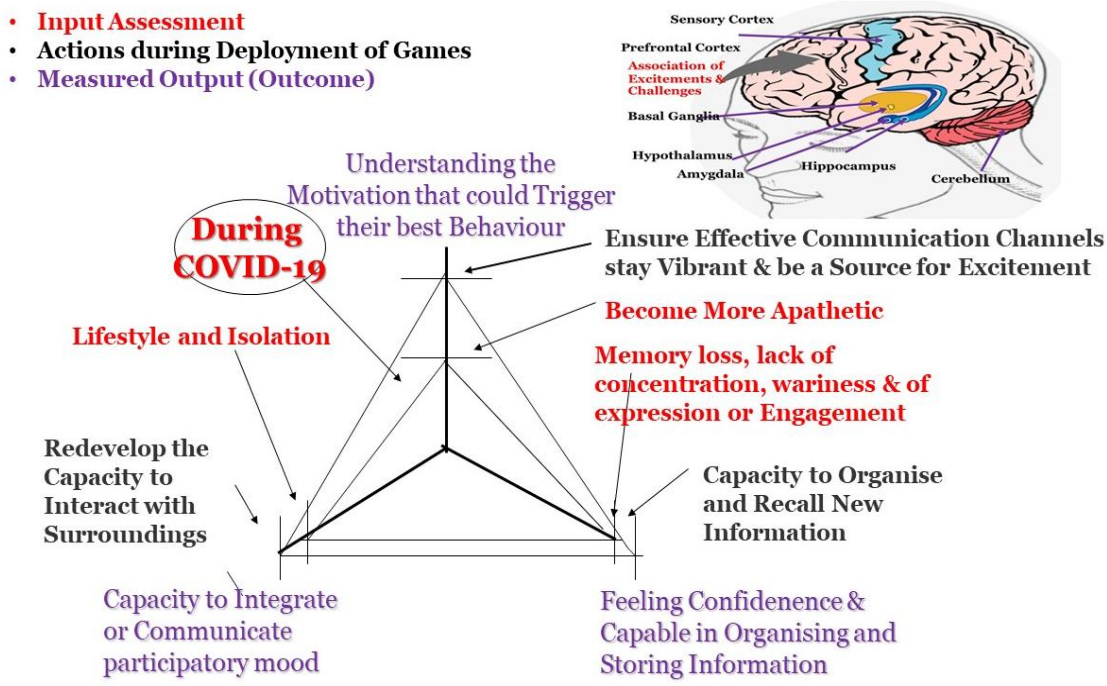

Figure (3). Illustrated the Complete Process of Overcoming the Constraints of Ageing Parents' Autonomy

5. Discussion

Gamification helps in triggering not only fluid thinking but also the counterfactual thinking, which help to bring possible alternatives to life events through "What if?".

Then the amygdala, also plays a role in attaching emotional significance to memories. These types of emotional memories are important for ageing parents who would be particularly reactive to strong emotional memories. This permanence of these memories suggests that interactions between the amygdala, hippocampus and neocortex are crucial in determining the 'stability' of memory – that is, how effectively it is retained over time.

Thinking about alternatives make the elder more conscious about which situations to select or avoid or interact with. There, the proposed framework exploits the ageing parent ability to be more functional and engaged. This act of engagement could make the ageing parent feel more pleasant and willing to make more efforts to talk, to go out, to comment, to take a bath, etc.

The act of engagement through gamification activities raise the possibilities of the ageing parent to re-learn to express feelings when they like something or feel unpleasant about any situation. The integration of the different types of thinking, i.e. the counterfactual with both the fluid and the crystallised thinking would help the ageing parent to be more capable to adapt to different situations in the future, or at least be more tolerant to it.

6. Conclusions and Recommendations

6.1. Mitigating the Ageing Parent Challenge of Memory Loss

Living with any kind of memory loss can be a very difficult challenge for the ageing parent. Helping your ageing parents remember leads to frustration of all the family members involved. In order to mitigate memory loss, there should be a type of excitement to the frontal lobe of the brain. Without this excitement, the elderly parent condition might deteriorate and may refuse to cooperate. This would increase the stress to the family members.

6.2. Mitigating the Loss of Curiosity When We Grow Older

When we grow older, we would have the difficulty of processing thinking that would lead us to figure out complex answers, or get engaged in community activities. The problem is exaggerated once we become less engaged with community activities. Therefore, this paper confirms that an early assessment of the ageing parent condition would make a great difference in the effect on the fluid thinking approaches outcome.

Being less engaged with the community make us start to lose our capacity to solve problems. Once we learn this stage, we lose our curiosity to explore life; we are not interested any more with the 'trial and error', or exploratory or experiential learning. This makes us lose the touch of observation, and then about to process an idea or develop it further.

6.3. Living with Goal-driven Activity

Losing goals in daily life make the ageing parent, not a goal-driven individual and thus not feel satisfied or dissatisfied with activity or its outcome. With goals, the ageing parent would look forward to the opportunity to improve their surroundings or work for more achievement for specific future.

Having goals is considered to be an important coping mechanism for the ageing parent. Both goals and thinking about a specific situation help the older adult to make sense of life and would encourage them to enhance their engagement with things and people around them.

6.4. Limitations and Implication

One of the limitations of this study is that it did not go through all the types of games designs possible for the ageing parents and the framework was not tested or pilot. However, this paper brings bring in implications for the caregivers and family members of the ageing parents. The paper opens a variety of opportunities for those concerned with ageing people memory loss; including practitioners of geriatric care, neuroscience, intergeneration, and gamification.

REFERENCES

[1] Altmeyer, M; Lessel, P; Krunger, A (2018) Investigating Gamification for Seniors Aged 75+, Proceedings of the 2018 Designing Interactive Systems Conference, Hong Kong. https://www.researchgate.net/publication/325704689_Investigating_Gamification_for_Seniors_Aged_75, Accessed on: 1/10/2020.

[2] Au J, Sheehan E, Tsai N, Duncan GJ, Buschkuehl M, Jaeggi SM (2015) Improving fluid intelligence with training on working memory: a meta-analysis. Psychon Bull Rev. 2015; 22(2): 366-77. doi:10.3758/s13423-014-0699-x.

[3] Barbey A (2018) Network Neuroscience Theory of Human Intelligence. Trends Cogn Sci (Regul Ed).; 22(1): 8-20. doi:10.1016/j.tics.2017.10.001.

[4] Brown, R (2016) Hebb and Cattell- The Genesis of the Theory of Fluid and Crystallized Intelligence. Front Hum Neurosci. 10:606.

[5] Buheji, M (2019a) Designing a Curious Life, AuthorHouse, UK.

[6] Buheji, M (2019b) Gamification Techniques to Re-Invent Public Healthcare Services – A Case Study, International Journal of Human Resource Studies, Vol. 9, No. 2. Pp. 339-351.

[7] Buheji, M. (2018) Re-Inventing Our Lives, A Handbook for Socio-Economic "Problem-Solving", AuthorHouse, UK.

[8] Buheji, M and Buheji, A (2020) Intelligent Living with

'Ageing Parents' During COVID-19 Pandemic. International Journal of Psychology and Behavioral Sciences; 10(3): 76-83.

[9] Buheji, M; Al-Nakash, A; Cunha, K; Rocha, R; da Silva, M; Yein, T; Al-Salman, J (2020) Mitigation of Risks of Complications and Deaths among the Elderly during Pandemics- Designing an Integrated Communication Framework Based on the Accumulated Experience of the Elderly Risks during the COVID-19 First Wave, American Journal of Medicine and Medical Sciences, Vol. 10 No. 7, pp. 494-502.

[10] Hartshorne J, Germine L (2015) When does cognitive functioning peak? The asynchronous rise and fall of different cognitive abilities across the life span. Psychol Sci.; 26(4): 433-43. doi:10.1177/0956797614567339.

[11] Horn, J. and Cattell, R. (1967) Age differences in fluid and crystallised intelligence. Acta Psychologica.; 26, 107-129. DOI: 10.1016/0001-6918(67)90011-X.

[12] Huepe, D; Roca, M; Salas, N; Canales-Johnson, A; Rivera-Rei, Á A; Zamorano, L et al. (2011) Fluid Intelligence and Psychosocial Outcome: From Logical Problem Solving to Social Adaptation. PLoS ONE 6(9): e24858. https://doi.org/10.1371/journal.pone.0024858.

[13] Jaeggi, SM, Buschkuehl, M, Jonides, J, and Perrig, WJ. (2008) Improving fluid intelligence with training on working memory. Proceedings of the National Academy of the Sciences; 105(19); 6829-6833. DOI: 10.1073/pnas.0801268105. Accessed on: 1/10/2020.

[14] Kievit R, Davis S, Griffiths J, Correia M, Cam-can, H (2016) A watershed model of individual differences in fluid intelligence. Neuropsychologia.; 91: 186-198. doi:10.1016/j.neuropsychologia.2016.08.008.

[15] Manard, M., Carabin, D., Jaspar, M., & Collette, F. (2014) Age-related decline in cognitive control: the role of fluid intelligence and processing speed. BMC neuroscience, 15, 7. https://doi.org/10.1186/1471-2202-15-7.

[16] Samuel, L (2017) Creative Aging, Sep 29, Psychology Today. https://www.psychologytoday.com/us/blog/boomers-30/201709/creative-aging. Accessed on: 1/10/2020.

[17] Zelinski, E. M., & Reyes, R. (2009). Cognitive benefits of computer games for older adults. Gerontechnology: international journal on the fundamental aspects of technology to serve the ageing society, 8(4), 220–235. https://doi.org/10.4017/gt.2009.08.04.004.00.